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ABSTRACT

This paper presents a summary of best practices for communication assessment and intervention with individuals who are deaf/blind and have a severe intellectual impairment. Focus is on individuals who have difficulty both receiving and understanding auditory, visual, and tactual information. The impact of sensory losses on communicative development is considered, followed by a discussion of general practices for communication intervention which stress a functional approach linking assessment and intervention and a multimodal delivery form. Means of facilitating communicative development include creating an optimal communication environment, using the team approach effectively, developing augmentative communication modes, and using compensatory teaching approaches and prompting techniques that bypass the sensory impairment. Recommendations address collaboration between organizations, increasing the number of potential communicative partners, early intervention, utilization of technological advances, and personnel preparation and inservice training. The paper concludes with a list of 52 references and related resources including 20 related articles, 5 assessment tools, 15 monographs and books, 9 video training tapes, 6 organizations, and 8 technological aids. (DB)

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Communication Intervention for Individuals with Dual Sensory and Intellectual Impairments

by
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Communication intervention for individuals with dual sensory impairments (deaf-blindness) continues to receive considerable attention as a critical need in the field. While significant advances certainly have been made, many individuals with both a dual sensory impairment and a severe intellectual impairment continue to experience extreme difficulty making their needs known. Although various means of communication have been tried with this population, truly effective interactions remain elusive. The extreme diversity of this population makes it difficult to address their equally varied communication needs.

To keep the focus on individuals having a dual sensory and intellectual impairment, those individuals who are labelled deaf-blind but who are not intellectually impaired and who do use language (spoken, signed, or written) will not be addressed in this paper. Instead, this paper[1] presents a summary of current best practices for communication assessment and intervention with those individuals who have difficulty both receiving and understanding auditory, visual, and tactual information. Recommendations for future intervention research and strategies address the areas in which greater development is needed to ensure effective communication skills for all individuals with this challenging disability.

Effective communicative exchanges often prove difficult for individuals with severe disabilities. This difficulty is exacerbated when the severe disability is both a dual sensory and intellectual impairment (Jensema, 1979; Rowland, 1990; Siegel-Causey & Guess, 1989). Helping these individuals develop and enhance communication skills poses a major challenge for direct service providers, many of whom have had limited experience and/or training in this area.

Perhaps one of the greatest hindrances to effective intervention is determining the makeup of this population. Many equate the label *dual sensory impaired* (or, more commonly, deaf-blind) with the familiar figure of Helen Keller and anticipate needs of the population accordingly. Despite the popular association with this very talented woman, the majority of individuals labelled deaf-blind do not fit this classic picture. In fact, 60% of the population with this label also have

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intellectual, physical, and behavioral disorders that seriously impact their ability to interact with others in a desired and conventional manner (Jensema, 1979; Stein, Palmer, & Weinberg, 1982). Unlike Helen Keller, most individuals with dual sensory, intellectual, and other impairments do not have a language per se (whether spoken English or American Sign Language), but attempt to make basic needs known by whatever means available to them. Since their unique situation poses such a profound challenge to interventionists, the target of this paper will be this group of individuals having severe sensory and intellectual (plus additional) disabilities.

Even within the subpopulation of people labelled dual sensory impaired who have intellectual and other impairments, an extreme diversity exists with regard to ability and needs. A few individuals have no functional hearing or vision. Others may be primarily visual learners with limited auditory ability; still others have no functional vision but have some ability to hear. Some individuals (labelled functionally deaf-blind) have no apparent physiological impairments of either sensory mode, yet do not make use of visual or auditory information. The purpose of this paper is to present the communicative interventions most often employed with these individuals and to suggest areas in which future efforts can be directed.

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Impact of Sensory Losses on Communicative Development

The development of effective communication skills relies heavily on appropriate sensory input and the ability to interpret that input during the early developmental years. Individuals with congenital sensory impairments, especially those with additional impairments, are at extreme risk for exhibiting delays in communicative skills (Rogow, 1988; Siegel-Causey, Ernst, & Guess, 1988). Visual and auditory information provides motivation for the young child to explore the environment, interact with people and objects, and understand the interrelationships between actions and events. Furthermore, these two sensory modes, especially vision, allow for considerable incidental learning. Approximately 90% of what a person perceives is obtained via the visual mode (Barraga, 1986). Since language learning depends heavily on accurate sensory input, the impact of any severe visual and hearing loss on the developing child will be significant. Compounding a vision and hearing loss with an intellectual (and possibly physical) impairment makes it clear why individuals with these multiple disabilities often experience difficulty in understanding or influencing their physical and social environments.

For example, at two years old, Carrie exhibits behaviors that reflect a

severe intellectual delay. Without vision or hearing, Carrie has not associated a basic vocabulary with meaningful people, objects, and events. She fears exploration of her world because it often results in painful accidents, and her physical impairments limit her ability to explore interesting items tactually. When she screams or thrashes, she gets picked up; besides this, she prefers to explore her own body, which is safe, readily available, and stimulating. She has learned to arch her back, shake her head, and scratch, pinch, or slap body parts for the stimulation these behaviors provide. This behavior is all absorbing and is not reinforcing for careproviders and other children. Carrie is left alone for long periods of time.

When a formal language is not learned, individuals with this complex disability rely heavily on partial communication systems. Some individuals may have a few formal signs (but are not fluent in American Sign Language). These people may also make use of facial expressions, vocalizations, gestures, and body movements, as well as manipulations of objects, pictures, and/or textures. Communication with familiar others may be somewhat effective but is usually limited to a few concrete referents representing needs, wants, and rejections, all very much bound to the present (e.g., pushing a bowl of food away to mean "finished"). Expressing abstractions (such as feelings, dreams, thoughts, or ideas about past or future events) often is not possible. This lack of meaningful expression and reception of ideas and feelings results in considerable frustration, which is sometimes manifested in behaviors often labelled socially inappropriate or unacceptable (Durand & Kishi, 1987; van Dijk, 1985). As the individual ages into adulthood, the continued inability to communicate effectively results in social isolation, frustration, and, presumably, depression.

General Practices for Communication Intervention

A review of the literature in effective communication strategies for the target population indicates that some areas overlap with interventions used for students labelled severely intellectually impaired (but no sensory loss). While much of the content area of the literature has significant implications for students with a dual sensory impairment, certain modifications may be needed.

A Functional Approach to Intervention

The functional approach to communication intervention recognizes that the acquisition of meaningful skills is highly individualized and depends to a great extent on individual needs and environmental demands (Rowland & Stremel-Campbell, 1987; Siegel-Causey, Ernst, & Guess, 1988). This approach emphasizes the unique situation of each individual and anticipates that, to a large extent, acquisition of skills depends on motivation (as determined by need and desire) and expectations of social roles in natural environments. Using this approach, an individual with dual sensory and intellectual impairments may learn

some symbolic communicative behaviors (e.g., using a smooth texture to request a drink), even though developmental scales might indicate that this individual does not exhibit the necessary "prerequisite" skills (e.g., sustained eye contact, reaching for an object).

Intervention is initiated based on an individual's need to communicate in a typical circumstance. The focus is not on helping the individual acquire developmental milestones but, rather, on enhancing specific skills for that individual within meaningful socio-communicative situations. All students are considered able to communicate and are not required to demonstrate skills that typically precede more formalized linguistic expression (Downing & Siegel-Causey, 1988; Siegel-Causey & Downing, 1987).

Assessing Communication Skills and Needs

The recognition that students communicate not at certain times of the day and in special environments with specially certified professionals but as the need and motivation arise throughout a typical day requires a unique type of assessment approach. Isolated test procedures that determine performance levels on some standardized form or checklist may severely underestimate actual communicative skills. Furthermore, such tests typically fail to evaluate the social environment and the real need and/or opportunities to communicate.

In order to be beneficial, assessment of communication skills must lead to practical intervention techniques. As such, a functional-ecological approach that identifies communication demands of the social environment and unique individual skills and discrepancies is recommended (Downing, 1989, in preparation). Assessment is individualized and contextual, and is shared as an ongoing responsibility by all direct service providers. Communication needs of each individual are identified within the context of meaningful activities, and observed discrepancies in performance are targeted for intervention (see Figures 1 and 2). The assessment process looks at the means and functions of communication required for a variety of interactions (see Stremel-Campbell, Clark-Guida, & Johnson-Dorn, 1984; Tedder & Sikka, 1992), with an emphasis on the communication strengths and limitations of all interactants. A team decision is then used to determine the most efficient intervention strategies for all communicators. As the student gains skills and/or as life needs change, additional activities and environments that are meaningful for the individual are assessed. The assessment process is ongoing, cumulative, and dynamic, not static.

From Assessment to Intervention

A functional-ecological assessment guides the team decision regarding the most effective teaching strategies to enhance communication skills. Specific techniques focus on what communicative partners can do to enhance the social atmosphere. These techniques involve reinforcing initial communicative attempts by being responsive to the intent of the student (Siegel-Causey, Ernst, & Guess, 1988); creating opportunities throughout

Figure 1
Functional Communication Assessment Form

Student: Activity:

NH Person Inventory (Steps)	Cues to Prompt Behavior (Visual, Auditory)	Student Performance + −	Discrepancy Why Not?	Teach or Adapt? What needs to happen?

Figure 2: Functional Communication Assessment Sample Activity

Student: Chris Age: 9 Activity: Eating lunch w/friends in school cafeteria

NH Person Inventory (Steps)	Cues to Prompt Behavior (Visual, Auditory)	Student Performance +	Student Performance -	Discrepancy Why Not?	Teach or Adapt? What needs to happen?
1. Go to cafeteria	Teacher direction, bell, peers going		–	Does not understand meaning of bell or teacher direction	Have peers cue him to check schedule & make sure he goes w/them
2. Wait in line	Others waiting in line	+			
3. Get tray & utensils	Stack of trays, utensils, and model of others	+			
4. Indicate choice of drink for lunch	Cafeteria worker asks the question		–	Does not understand he has a choice; no speech	Cafeteria worker holds up 2 choices
5. Pay for lunch	Cafeteria worker asks for tickets		–	Does not understand need to pay	Peer cues him to present ticket (kept in fanny pack)
6. Find seat	Tables & chairs	+			
7. Eat lunch	Food, hunger, others eating	+			
8. Engage in social conversation w/friends	Others engaged in conversation		–	Nonverbal; does not know how to respond, imitate	Teach use of pictorial conversation in book; teach peer to use it
9. Clean up	Dirty tray, trash; knowledge of routine; peer models		–	Does not understand the routine	Peer cues by pointing & modeling

each activity for communication (Downing & Siegel-Causey, 1988); and creating social environments (cooperative learning, peer buddies, shared materials, physical proximity) (Downing & Eichinger, 1990). Other techniques focus on the specific interaction with the individual, with the intent of shaping limited behavioral repertoires into more established and conventional behaviors. Toward this goal, interventionists have demonstrated the effectiveness of modeling the desired behavior (Rowland & Stremel-Campbell, 1987; van Dijk, 1985); using prompt delay to encourage the student's initiative behavior (Goetz, Gee, & Sailor, 1985; Halle, Baer, & Spradlin, 1981); and fading instruction (Halle, 1987; van Dijk, 1966, 1985).

Multimodal Approach to Intervention

Since communication needs and abilities are extremely diverse, determination of the one most appropriate mode of communication for these individuals may not be possible. Current thinking recognizes the value of exploring a variety of possible communicative modes both for reception and expression (Allaire, Gressard, Blackman, & Hostler, 1991; Downing & Siegel-Causey, 1988; Hamre-Nietupski, Nietupski, & Rathe, 1986; Mirenda & Iacono, 1990; Reichle & Karlan, 1985). This approach is particularly appropriate for individuals with dual sensory impairments whose limited sensory input demands a wide range of communicative options.

Individuals with dual sensory and intellectual impairments often receive instruction in manual signs as one of the first options. While American Sign Language (ASL) is the fourth most commonly used language in the United States, and certainly the language most frequently used by those who are deaf, its benefits for children labelled dual sensory and intellectually impaired remain in question (Bryen, Goldman, & Quinlisk-Gill, 1988; Rotholz, Berkowitz, & Burberry, 1989; van Dijk, 1985). American Sign Language is a true abstract language with its own semantic and syntactic structure (Klima & Bellugi, 1979). It also is a visual-spatial language requiring motoric dexterity, visual or tactile perception, and extensive cognitive abilities. The requirements of such a language make it questionable as the most effective means of communication for this population of individuals having visual, intellectual, and possibly physical impairments. As a result, many individuals may use a few manual signs (not ASL) for both reception and expression, but must rely on other modes of communication when the appropriate sign is not known or cannot be physically produced, or when the communicative partner has no knowledge of a manual system.

Considerable effort has gone into developing and teaching alternative modes of communication. Interventionists have reported on the use of:

- nonsymbolic communicative modes (gestures, facial expressions, body movements) (Siegel-Causey & Downing, 1987; Siegel-Causey & Guess, 1989);

- tangible symbols (objects or parts of objects) (Rowland & Schweigert, 1989);
- pictorial symbols (photographs, line drawings) (Hunt, Alwell, & Goetz, 1991; van Dijk, 1985); and
- textured symbols (Murray-Branch, Udvari-Solner, & Bailey, 1991).

Determination of the most effective modes of communication vary depending on the ability level of student, the ability of the audience with whom that person interacts, and the motivational level of the individual. One student with dual sensory and intellectual impairments may well use several modes of communication throughout each day as abilities, needs, and social expectations change. For example, Sid uses eye contact and facial expressions to greet peers, express feelings, and clarify intent. He also uses five signs to express basic generic needs (want, help, eat, more, and drink), and he extends or points to objects to clarify intent and to comment on things of interest.

Facilitating Communicative Development

While basic principles of effective communication intervention for individuals with severe disabilities hold considerable value for the target population, certain adaptations are needed to compensate for the sensory loss. These adaptations take the form of developing unique augmentative communication devices, teaching compensatory strategies to help the individual make use of residual sensory input, and using specialized prompting techniques. These adapted strategies are felt to be most effective when learning environments are normalized for the individual and when an effective team approach is used.

Creating an Optimal Communication Environment

Proponents of the inclusion model (Downing & Eichinger, 1990; Giangreco, Dennis, Cloninger, Edelman, & Schattman, 1993; Hamre-Nietupski, McDonald, & Nietupski, 1992; Stainback & Stainback, 1992; Thousand & Villa, 1990) recognize the importance of educating all individuals in their home schools and communities. Factors such as the importance of family and friends, the difficulty with transferring learned skills to the natural environment, and the need to build natural community support systems are the guiding principles behind the rationale for educating individuals with dual sensory impairments in their home schools and communities.

Obviously, placement issues play a major role in communication intervention. It is difficult to maintain the critical role of the family as team members when the individual lives far from home. Identifying activities, environments, and people with whom the individual must learn to communicate becomes particularly challenging when that individual is being taught in an entirely different community.

Enhancing communicative options for individuals with the deaf-blind label requires broadening the number of natural communicative partners. It is imperative to specifically teach parents, siblings, nondisabled students, and coworkers how

to interact with this individual. These critical communication partners will need to be taught how to respond to an extremely limited behavioral repertoire, what to do in the case of nonconventional and inappropriate behaviors, and how to encourage daily interactions. In addition, these people serve as the role models for appropriate communicative behavior. When individuals with this disability are homogeneously grouped residentially, for leisure, work, or instruction, the limited communication skills of all present make it extremely difficult to enhance skills. Ongoing daily interactions with highly responsive and competent communication partners are recommended. Nondisabled peers of all ages and family members are likely candidates to provide the necessary communicative support.

Using the Team Approach Effectively

When individuals have dual sensory and intellectual impairments, the number of potential team members can be quite large. Given the target population's complex learning and communicative needs, no one professional can be expected to address all problem areas. The knowledge, skills, and experience of many individuals working collaboratively are essential. Information is needed on options for alternative and augmentative communication modes. Vision assessments must be interpreted to assist in the development of appropriate augmentative communicative modes that best meet the visual skills and abilities of the individual. Information from audiological exams, audiograms, and functional hearing assessments can address the need for reduced environmental noise, amplification, recommended distance from the speaker, and potential use of manual sign systems. Team members need to determine the most appropriate position(s), range of motion options, methods of message selection (direct, scanning, encoding), and the need for any physical adaptations to make the communication exchange most efficient.

The primary direct service provider incorporates the expertise of all team members into a unified program that addresses the individual's communication needs throughout each day. This provider is in an excellent position to identify communication skills and limitations as they naturally occur during meaningful and age-appropriate activities.

Family members are essential to any effective intervention strategy; they can provide critical information concerning communicative skills displayed at home, as well as communicative needs. Their input must be obtained to determine present and future plans for their child, such as friendship development and participation in typical social events (Giangreco et al., 1993). Such input provides the necessary direction for communication skills intervention. In addition, nondisabled peers will need to be encouraged to provide valuable information on content, age-appropriate means of expression, and the need for communication in typical environments. These peers, as equal communication partners for the individual with dual sensory and intellectual impairments, need to problem-solve with other team mem-

bers to ensure that the intervention is age-appropriate and acceptable to the peer group.

Integrating available services works best when team members are provided with the time to collaborate and are allowed to contribute what they *can* to the process of intervention versus what they are *expected* to contribute based on certification or training (York, Giangreco, Vandercook, & Macdonald, 1992). Intervention in this manner requires considerable role release, respect for other discipline expertise, and a person-centered focus that takes precedence over professionals' schedules and areas of specialization.

Developing Augmentative Communication Modes

When vision and hearing losses plus intellectual impairments interfere with conventional receptive and expressive communication, alternative modes must be developed. Determining the most effective modes of communication for a given individual depends on that person's needs and preferences, as well as his or her learning mode.

For students who are able to see manual signs clearly, reproduce these signs clearly, and recall these signs as needed, and who have access to others who understand the signs, a manual system may be effective. Some may respond well to the signs presented to them (both visually or tactually), but may not use these signs for expressive purposes. The problems of relying solely on manual signs for all communicative purposes are the limited audience knowledgeable in sign systems (especially modified ones) and the physical and cognitive demands placed on the person.

For many individuals with this disability, augmentative communication devices provide the necessary additional adaptation for more effective interactions. However, given a substantial visual impairment, the customary use of pictorial and/or graphic symbols for such devices may not be sufficient. Pictures may need to be enlarged, contrasted with color, and/or color highlighted. Some individuals with color vision may learn to associate given symbols with the color, even if unable to see the actual design (Bailey & Downing, in preparation).

Individuals with insufficient vision to receive visual information for communication will need to be taught how to make use of auditory information. To assist such an individual, information of this nature can be amplified, provided with limited background noise, and presented at a reduced rate of speech. With insufficient hearing to detect speech clearly, exaggerated tone of voice can provide added information (e.g., the rise in intonation at the end of a sentence typically signifies a question is being asked).

A relatively small number of individuals will require a tactile mode of communication when both visual and auditory modes provide insufficient information for effective communication. Tactile communication modes have been developed which make use of real-life objects to represent events (Writer, 1987; van Dijk, 1984), parts of objects or

miniatures (Rowland & Schweigert, 1989), and abstract textured symbols (Mathy-Laikko et al., 1989; Murray-Branch et al., 1991). The systematic pairing of these tactile objects or textures with their corresponding referent provides the individual with a means of expressing needs and of understanding upcoming events. Since none of the adapted augmentative devices represents a complete communication system for a given individual, such devices must be paired with instruction in the use of nonsymbolic modes (e.g., facial expressions, gestures, vocalizations), especially when such communicative behavior clearly conveys the message. Determining the most effective augmentative communication modes to use per social situation requires a careful team analysis, the creativity of various team members, and systematic experimentation with the selected devices.

Compensatory Teaching for Effective Vision and Hearing Use

Some individuals may have sufficient sensory input to make some use of pictorial/written augmentative communication devices or oral language. However, without the proper training in interpreting visual and/or auditory input, the individual may not be able to rely on this type of sensory input. The individual must be taught how to use vision and hearing before effective interactions with the environment are possible.

Associatively pairing the visual or auditory stimuli with the response that follows helps the individual make sense of incoming visual and auditory stimuli (Bailey & Downing, in preparation). Repetition for practice, consistency of presentation, and exaggeration of visual/auditory information represent strategies used to teach the individual to make sense of incoming, albeit limited, sensory input. Once the individual learns the relationship between auditory and/or visual stimuli and the resulting event, more readily available communication modes (speech, pictorial communication devices) can be employed. As with the instruction of communication skills, teaching an individual to make use of sensory information occurs during typical and meaningful activities, not in isolation.

Prompting Techniques that Bypass the Sensory Impairment

Since the visual mode provides the greatest access to information, it is not surprising that most teachers focus on this sensory mode. Teachers typically model the desired response and rely on visual imitation for student acquisition of skills. Verbal instruction is provided to clarify the demonstration. The individual with dual sensory and intellectual impairments may not receive or understand enough of this type of information to meet teacher expectations.

Ensuring that information is received by the individual requires the addition of tactual information. The use of common objects to signal upcoming events is one such form of tactual input. For example, the individual is cued to go dress for swimming by placing the swimsuit in his or her hands. Touch cues

(often in conjunction with objects) also clarify teacher direction (e.g., a touch on the hand signifies that it is time to begin work following a break). Considerable information can be shared with an individual via the use of specific touch cues (Rowland & Stremel-Campbell, 1987). Pressure against someone's shoulder to prevent forward movement signals the need to stop or wait. A pat on the shoulder can indicate satisfaction with one's work. A brush along the forearm can be a sign of greeting. These touch cues, provided contextually and paired consistently with events, can convey at least some of the information available through more conventional visual and auditory behaviors.

Physical manipulation of an individual's hands and body to perform tasks occurs frequently with this population, due to the absence of sensory information and, therefore, reduced ability to respond to natural cues in the environment. Though physical manipulation provides the necessary information, it may promote a form of learned helplessness by teaching the individual that the interaction requires this type of hand-over-hand manipulation. Spontaneity of expression may be reduced as the individual learns to respond to communicative requests but does not learn to initiate interactions. To avoid this situation, a systematic procedure for fading physical assistance as soon as possible is recommended (Halle, 1987; van Dijk, 1985).

Based on van Dijk's (1966) theories of communicative intervention for children labelled deaf-blind, a movement-based approach that requires the teacher to move co-actively with the child holds considerable merit for the student with limited sensory input (Writer, 1987). Initially, the teacher moves with the individual as a form of tactual modeling or shadowing in order to establish desired communicative behaviors. The distance between student and teacher is increased as the desired behavior is acquired. The ability to increase distance from the individual and fade assistance is most likely when activities are structured in such a way that they become easily recognized routines. One step of the activity cues the individual to perform the next step. The individual internalizes the routine to avoid relying on external sensory information (e.g., natural cues in the environment) that are not readily available due to the sensory losses. Careful adherence to the steps of the activity in the sequence preferred by the individual and effective manipulation of tactual items in the environment can reduce the need for excessive and highly directive physical prompting.

Future Recommendations

A number of recommendations can be made to address the critical problems associated with serving individuals with dual sensory impairments and intellectual impairments.

Collaboration Between Organizations

Organizations serving people with dual sensory impairments will need to collaborate on efforts to find the most efficient and effective means of communi-

cation skill intervention. The Association for Persons with Severe Handicaps (TASH), the American Speech-Language-Hearing Association (ASHA), the Association for Education and Rehabilitation of the Blind and Visually Impaired (AER), the American Association of the Deaf-Blind, and the American Foundation for the Blind, Deaf-Blind Project, have considerable knowledge related to serving students with dual sensory and intellectual impairments. Although the knowledge base comes from different perspectives, the ability of these organizations to impact service providers on a national level can be considerable. The different areas of expertise which each of these organizations possesses need to be integrated into a body of knowledge that is readily available to the practitioner and in an easy-to-implement form. Collaborative efforts could occur in research activities to identify more effective means of facilitating communicative development, personnel preparation to increase the number of skilled professionals for this population, and technical assistance efforts to provide needed knowledge and skills to service providers and families currently supporting individuals with this disability.

Increasing the Number of Potential Communicative Partners

Limited attention has been paid to the critical area of social interactions with nondisabled peers (of any age). Despite the extreme loneliness and isolation associated with this disability (Smithdas, 1981; van Dijk, 1966), efforts to develop natural supports (friendships) have yet to receive the attention they deserve. The focus has remained on communication training by teachers, emphasizing the acquisition of basic communicative functions (e.g., requesting, rejecting) (Halle, 1987; Romer & Schoenberg, 1991).

Since communication is a dynamic interaction between individuals, future efforts must address the need to teach potential communicative partners the unique ways of communicating with someone who is dual sensory and intellectually impaired. Building on the work done by Hunt, Alwell, and Goetz (1991), nondisabled peers and individuals with dual sensory and intellectual impairments can learn to become conversational partners who use other functions of communication besides requesting and rejecting. For example, a student with this disability can use a specially adapted scrapbook of collected objects acquired on various outings to show peers. Turning pages, pointing to objects, and receiving tactile cues back from peers (e.g., pats on the hand) takes the place of the typical verbal exchange. The interactive nature of true communication requires that both conversational partners understand and make use of multimodes of communication. Intervention will need to target both partners, not just the individual with the disability.

Early Intervention

Little disagreement exists over the need to provide support services to children with this low incidence disability. Limited sensory input severely impacts the developing child, making it extremely difficult for the child to understand causal

relationships in the environment that are so critical to basic language skills (Michael & Paul, 1991; Walker & Kershman, 1981). The longer the child has difficulty receiving and interpreting sensory information, the greater the likelihood of the child turning inward and becoming less responsive to the social environment. The negative impact of sensory deficits on the development of language and learning is clear. Children with dual sensory impairments cannot be expected to respond to stimuli they cannot detect.

The relatively new focus on the family for early intervention efforts has particular relevance for the young child with this complex disability. Since such a child may not respond as expected to visual and/or auditory stimuli (mother's face, sound of father's voice, etc.), careproviders must receive specific support on how to most effectively communicate with their child (Siegel-Causey, Ernst, & Guess, 1988). Both caregivers and the child require ongoing support from birth to develop alternative and satisfactory ways to interact.

Technology

Technological advances in the field of special education and augmentative communication have greatly impacted professionals' abilities to meet the needs of those they serve. Technology exists to improve visual functioning, auditory functioning, motoric functioning, and communicative reception and expression. Technology also exists to bypass limitations imposed by sensory and physical disabilities (e.g., vibrotactile communication aids, computers with synthesized speech output).

Traditionally, technological advances have been employed with students who have disabilities but who are able to demonstrate understanding of the technological tool. Individuals with a dual sensory impairment that is compounded by an intellectual impairment have not benefited substantially from the onslaught of advances in the technological field. These individuals may be excluded from technological assistance due to their perceived inability to make use of these tools (Fredericks & Baldwin, 1987; Jones, Spellman, & Ozier, 1988; Locke & Mirenda, 1988; Schweigert, 1987). On the other hand, a study by Parker et al. (1990) suggests that it is in fact the professionals who may feel reluctant to use technological aids, due to their lack of familiarity, knowledge, and skills.

Hindered by the inability to access sensory information (as well as interpret this information), individuals with this disability need every opportunity to bypass barriers to their learning potential and experience effective technological alternatives. While some researchers have explored the potential of teaching contingency awareness to individuals with complex needs (Schweigert, 1987, 1989), a broader use of technology to address more comprehensive communicative needs has yet to be fully investigated.

Personnel Preparation and Inservice Training

Since the incidence of individuals with deaf-blindness is quite low

(Fredericks & Baldwin, 1987), it is not surprising that an equally low number of skilled personnel exists to support these individuals. Information concerning the impact of sensory losses on the developing child and adult, especially with regard to communication, must become part of course content required for teacher and related staff certification for this population. In addition, a multidisciplinary approach at institutions of higher learning is recommended to model and teach the collaborative skills needed when diverse groups of professionals converge to support a given individual.

Given the complexity of communication needs and the fact that available adaptations and strategies change so quickly, it is difficult even for experts in the field to stay on top of the most current information. Due to the paucity of trained professionals in this field, efforts must be taken to provide preservice and inservice training where needed. The increased interest in and development of long distance learning and interactive satellite teleconferencing (Parsons, 1990; Sanspree, Allison, & Gargiulo, 1991) may provide the means of getting the necessary information to those faced with the challenge of supporting an individual labelled deaf-blind. Educating the professionals who serve these individuals in their home communities would build stronger familial and community supports.

Summary

For individuals with dual sensory and intellectual impairments, the lack of effective communication skills places severe limitations on their learning potential and sense of belonging. Educational intervention for this population has recognized the critical need to develop communication skills, yet the complexity of the individual's needs continues to plague progress. The unique needs and situations of individuals in this category, coupled with the extremely limited numbers of trained and experienced professionals, challenge the field to develop creative means of addressing this vital issue.

Documented case studies provide the field with examples of potential options to employ when addressing the communicative needs of individuals with dual sensory and intellectual impairments. However, these case studies provide partial communication systems that address partial communicative needs. Providing individuals having severe sensory, intellectual, and other disabilities with a true language that can meet all communication needs, both receptive and expressive, is still beyond our grasp. Future efforts with this focus will need to combine early intervention, creative technology, and principles of normalization in order to be successful.

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Publisher: Teaching Research Publications, 345 N. Monmouth Ave., Monmouth, OR 97361. Telephone: (503) 838-8779. Cost: Cost of blank tape, plus shipping and handling.

Organizations

Association for Education & Rehabilitation of the Blind and Visually Impaired (AER), Division of Multihandicapped & Deaf-Blind, 206 N. Washington St., Alexandria, VA 22314.

American Foundation for the Blind, Deaf-Blind Project, 15 W. 16th St., New York, NY 10011. Telephone: (212) 620-2000.

American Speech-Language-Hearing Association (ASHA), 10801 Rockville Pike, Rockville, MD. Telephone: (301) 897-5700.

Helen Keller National Center - Technical Assistance Center (HKNC-TAC), 111 Middle Neck Rd., Sands Point, NY 11050-1299. Telephone: (516) 944-8900 (Voice/TDD).

ISAAC (International Society for Augmentative & Alternative Communication), P.O. Box 1762, Station R, Toronto, Ontario Canada M4G 4A3. Telephone: (416) T37-9308.

Teaching Research Assistance to Children & Youth Experiencing Sensory Impairments (TRACES), Teaching Research Division (WOSC), 345 N. Monmouth Ave, Monmouth, OR 97361. Telephone: (503) 838-8150.

Technological Aids:
A Sample of Software Used With Children With Dual Sensory Impairments

Title:	**Charlie Brown's ABC's**
Description:	Alphabet software with large print, large animated graphics
Use With:	Standard Keyboard, Unicorn Keyboard, AFC
Publisher:	American School Publishers, Princeton Road, P.O. Box 408, Hightstown, NJ 08520
Telephone:	(800) 843-8855
Available From:	Local Computer Store

Title:	**Creature Antics, Creature Capers, Creature Features**
Description:	Animated Cause and Effect Software
Use With:	Standard Keyboard, Touch Window, AFC, Switches
Publisher:	Laureate Learning Systems, Inc., 110 East Spring Street, Winooski, VT 05404
Telephone:	(802) 655-4755
Available From:	Laureate, Don Johnston, Computability, Access-Unlimited

Title:	**Explore-A-Story, Explore-A-Science, Explore-A-Classic**
Description:	Software with Moveable Graphics
Use With:	Standard Keyboard, Joystick, Mouse, AFC
Publisher:	D.C. Heath & Company, 125 Spring Street, Lexington, MA 02173
Telephone:	(617) 860-1847
Available From:	D.C. Heath

Title:	**McGee, McGee Visits Katie's Farm, McGee at the Fun Fair**
Description:	No words Preschool Software
Use With:	Apple IIgs
Publisher:	Lawrence Productions, Inc., 1800 South 35th St, Galesburg, MI 49053-9687
Telephone:	(800) 421-4157
Available From:	Local Computer Store

Title:	**Muppet Slate, Seasons and Special Days, More Special Days**
Description:	Large Print Word Processor With Pictures
Use With:	Muppet Learning Keys, Standard Keyboard, Unicorn Keyboard
Publisher:	Sunburst Communications, 39 Washington Ave, Pleasantville, NY 10570
Telephone:	(800)431-1934
Available From:	Sunburst Communications

Title:	**Stickybear ABC, Stickybear Numbers, Stickybear Opposites**
Description:	Preschool Software With Large Colorful Graphics
Use With:	Standard Keyboard, Unicorn Keyboard, AFC
Publisher:	Weekly Reader Software, 245 Long Hill Road, Middletown, CT 06457
Available From:	Local Computer Store

Title:	**Touch'N Match, Touch'N See**
Description:	Picture and Word Matching Software
Use With:	Touch Window
Publisher:	Edmark Corporation, P.O. Box 3903, Bellevue, WA 98009
Telephone:	(206)746-3900
Available From:	Edmark Corporation

Title:	**Touch'N Write**
Description:	Software for Handwriting Skills, Visual Motor Skills
Use With:	Touch Window
Publisher:	Sunburst Communications, 39 Washington Ave, Pleasantville, NY 10570
Telephone:	(800)431-1934
Available From:	Sunburst Communications